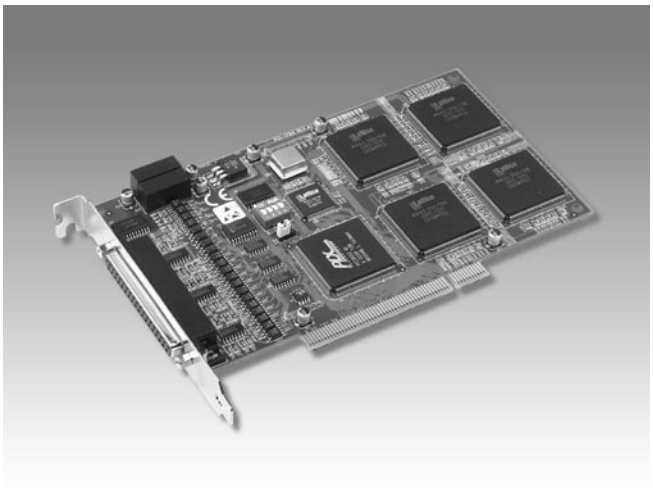
PCI-1784

4-axis Quadrature Encoder and Counter Card



Features

- Four 32-bit up/down counters
- Single ended or differential inputs
- Pulse/direction and up/down counter
- x1, x2, x4 counts for each encoder cycle
- Optically isolated up to 2,500 V_{DC}
- 4-stage digital filter with selectable sampling rate
- On-board 8-bit timer with wide range time-base selector
- Multiple interrupt sources for precision application
- 4 isolated digital input
- 4 isolated digital output
- BoardID™ switch

CE

Introduction

The PCI-1784 is a 4-axis quadrature encoder and counter add-on card for PCI bus. The card includes four 32-bit quadruple AB phase encoder counters, 8-bit timer with multi range time-base selector and 4 isolated digital inputs as well as 4 isolated digital outputs. Its flexible interrupt sources are suitable for motor control and position monitoring.

Specifications

Encoder Input

- **Number of Axes** 4 (independent)
- **Resolution** 32-bit
- **Max. Quadrature Input** 1.0 MHz with Digital Filter
  2.0 MHz without Digital Filter
- **Digital Filter** 4 stage
- **Drive Type** Single-ended or differential
- **Counter Mode** Quadrature, Up/Down, Count/Direction
- **Optical Isolation** 2,500 V_{DC}
- **Max. Input Pulse Freq.** x 1, x 2, x 4
- **Sample Clock Freq.** 8, 4, 2, or 1 MHz

Input Range

- **Single Ended Configuration:**

Input	Logic
CH- = 0V (GND) CH+ > 2.8V	High
CH- = 0V (GND) CH+ < 0.8V	Low

CH+ max. input voltage: +12V

- **Differential Configuration:**

Input	Logic
CH+ - CH- > 0.2V	High
-0.2V < CH+ - CH- < 0.2V	Unknown
CH+ - CH- < -0.2V	Low

CH+/CH- max. input voltage: ±12V

Timer

- **Resolution** 8-bit
- **Time Base** 50 , 5 k, 500, 50, 5 Hz

Isolated Digital Input

- **Channels** 4
- **Optical Isolation** 2,500 V_{DC}
- **Opto-Isolator Rsp.Time** 25 ms
- **Over-Voltage Protection** 70 V_{DC}
- **Input Voltage** VIH (max.) 30 V_{DC}
  VIH (min.) 10 V_{DC}
  VIL (max.) 3 V_{DC}

Isolated Digital Output

- **Channels** 4
- **Optical Isolation** 2,500 V_{DC}
- **Response Time** 20 ms (max.)
- **Supply Voltage** TTL level
- **Sink/Source Current** 50 mA max./channel

Interrupt

- **Source** Counter overflow, Counter underflow, Index input, Timer, Digital input

Counter Latch

- **Source** Software, Timer, Index input, Digital input

General

- **I/O Connector Type** 37-pin D-sub female
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical +5 V @ 200 mA
  Max. +5 V @ 450 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Relative Humidity** 5~95% RH non-condensing (refer to IEC 68-2-3)
- **Certifications** CE certified

Last updated : January 2005

Ordering Information

- **PCI-1784** 4-axis Quadrature Encoder and Counter Card
- **PCL-10137H-1** High-speed DB37 cable assembly, 1m
- **PCL-10137H-3** High-speed DB37 cable assembly, 3m
- **ADAM-3937** DB37 Wiring Terminal Board for DIN-rail mounting

Feature Details

Encoder Interface

Each channel includes a decoding circuit for incremental quadrature encoding. Inputs accept either single-ended or differential signals. Quadrature input works with or without an index, allowing linear or rotary encoder feedback.

Counters

The PCI-1784 has four independent 32-bit counters. The maximum quadrature input rate is 2 MHz, and the maximum input rate in counter mode is 8 MHz. You can individually configure each counter for quadrature decoding, pulse/direction counting or up/down counting.

Digital Input and Interrupts

The PCI-1784 provides four digital input channels. Each channel accepts digital input as an index input for a rotary encoder or as a home sensor input for a linear encoder. The card can generate an interrupt to the system based on a signal from its digital inputs, overflow/underflow and overcompare/undercompare of its counters, or on a programmed time interval. It can repeatedly generate interrupts at any time interval you specify, from 20 microseconds to 51 seconds. These interrupts let you precisely monitor the speed of a control system.

Flexible Digital Output function

The PCI-1784 provides four digital output channels. Each channel accepts digital output as a normal TTL output for a rotary encoder, or as an indicated output with pulse/level mode for a linear encoder. The PCI-1784 can generate an indicated output based on a signal from overcompare/undercompare of its counters. The pulse width of an indicated output depends on the counter clock or clear interrupt.

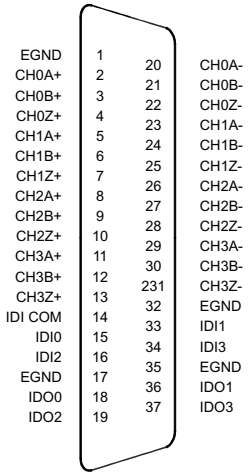
Special Shielded Cable for Noise Reduction

The PCL-10137H shielded cable is specially designed for the PCI-1784 for reducing noise. Its wires are all twisted pairs, and the input signals and output signals are separately shielded, providing minimal cross talk between signals and the best protection against EMI/EMC problems.

BoardID™ Switch

The PCI-1784 has a built-in DIP switch that helps define each card's unique ID when multiple PCI-1784 cards have been installed on the same PC chassis. The BoardID switch setting function is very useful when users build their system with multiple PCI-1784 cards. With correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

Pin Assignments



Block Diagram